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EXAMINER

RASHID, DAVID

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/596,052	Applicant(s) KIMURA, TOKUNORI	
	Examiner DAVID P. RASHID	Art Unit 2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-44 is/are pending in the application.
- 4a) Of the above claim(s) 30-36,39,40,43 and 44 is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-7,9,11-14,16-18,20,24,27-29,37,38,41 and 42 is/are rejected.
- 7) ☒ Claim(s) 8,10,15,19,21-23,25 and 26 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☒ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____. |

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Amendment & Claim Status

[1] This office action is responsive to *Response To Restriction Requirement* (“Response”) received Nov. 6, 2009. Claims 1-44 remain pending; Claims 30-36, 39-40, 43, and 44 withdrawn.

Election/Restrictions

[2] Applicant’s election without traverse of **Invention I** comprising Claims 1-29, 37, 38, 41, and 42 in the reply filed on Nov. 6, 2009 is acknowledged. See Response at p. 1. Claims 30-36, 39-40, 43, and 44 are withdrawn.

Requirement for Information

[3] Applicant’s response to the requirement for information has been considered and fulfilled.

Priority

[4] Acknowledgment is made of applicant's claim for foreign priority based on an application filed in Japan on Nov. 12, 2004. It is noted, however, that applicant has not filed a certified copy of JP App. No. 2004-329783 as required by 35 U.S.C. 119(b). See also PCT Rule 17.1(b).

Information Disclosure Statement

[5] The information disclosure statements filed May 26, 2006, Jul. 12, 2006, and Jul. 23, 2006 comply with the provisions of 37 C.F.R. § 1.97, 1.98 and M.P.E.P. § 609. It has been placed in the application file, and the information referred to therein has been considered as to the merits.

[6] The information disclosure statement filed Jun. 3, 2008 fails to comply with the provisions of 37 CFR 1.97, 1.98 and MPEP § 609 because there is no attached CN Office Action in a counterpart of this application. It has been placed in the application file, but the information referred to therein has not been considered as to the merits. Applicant is advised that the date of any re-submission of any item of information contained in this information disclosure statement or the submission of any missing element(s) will be the date of submission for purposes of determining compliance with the requirements based on the time of filing the statement, including all certification requirements for statements under 37 CFR 1.97(e). See MPEP § 609.05(a).

Claim Objections

[7] The following is a quotation of the second paragraph of 37 C.F.R. § 1.75(a):

The specification must conclude with a claim particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention or discovery

[8] Claims 7, 11, and 17 are objected to under 37 C.F.R. § 1.75(a), for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention.

Claim 7, line 4, should be "to three or more areas ~~or more~~ of said image data".

Claim 11, line 4, should be "receiving radio frequency (RF) ~~RF~~ coil is arranged".

Claim 17, line 2, should be "wherein said movement information".

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Claim Rejections - 35 U.S.C. § 112

[9] The following is a quotation of the second paragraph of 35 U.S.C. § 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

[10] **Claim 6** is rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 6, line 5, "the exterior" lacks clear antecedent basis and is unclear what exterior it refers to.

Claim Rejections - 35 U.S.C. § 102

[11] The following is a quotation of the appropriate paragraphs of 35 U.S.C. § 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(c) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Takizawa

[12] **Claims 1-5, 7, 9, 11-14, 16-18, 20, 24, 27-29, 37-38, 41, and 42** are rejected under § 102(b) as being anticipated by J.P. 2000-157507 ("Takizawa"). A machine-generated English translation has been provided.

Regarding **Claim 1**, Takizawa discloses an image data correcting device (fig. 1) comprising:

a movement information acquiring section (fig. 1, item 406) for acquiring movement information ("[t]he signal which each small RF coil of multiple coils received is detected" at ¶

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0014) showing a spatial distribution (e.g., fig. 8, spatial distribution items 1011, 1021, 1022) of the magnitude of a movement in the real space of an image pickup part (fig. 1, item 405; fig. 8) of a detected body (fig. 8, item 1011 and the four smaller circles contained within item 1011);

a correcting section (fig. 1, item 407) for making a correction different (fig. 8, items 1022 and 1023 are different) from that of a second area (fig. 8, top-right inner circle within item 1011) in a first area (fig. 8, bottom-right inner circle within item 1011) of image data of the image pickup part (fig. 1, item 405; fig. 8) of said detected body (fig. 8, item 1011 and the four smaller circles contained within item 1011) collected by a scan of magnetic resonance imaging (fig. 1) on the basis of said movement information ("signal processing part 407 has the body motion compensation means using the navigation echo" at ¶ 0015); and

a synthesizing section (fig. 1, item 408) for synthesizing respective image data of said first area and said second area corrected by said correcting section ("[t]he combined picture is displayed by the indicator 408" at ¶ 0015).

Regarding **Claim 2**, Takizawa discloses wherein said correcting section (fig. 1, item 407) is constructed so as to perform linear correction processing according to a spatially ununiform deteriorating degree (¶¶ 0029-0030) of said image data (fig. 1, item 405; fig. 8) generated by the movement (e.g., fig. 8, spatial distribution items 1011, 1021, 1022) of said image pickup part (fig. 1, item 405; fig. 8).

Regarding **Claim 3**, Takizawa discloses wherein said synthesizing section (fig. 1, item 408) is constructed so as to synthesize ("[t]he combined picture is displayed by the indicator 408" at ¶ 0015) the image data (fig. 1, item 405; fig. 8) after a first correction in said first area (fig. 8, bottom-right inner circle within item 1011), and the image data after a second correction different from said first correction in said second area (fig. 8, top-right inner circle within item 1011).

Regarding **Claim 4**, Takizawa discloses wherein said synthesizing section (fig. 1, item 408) is constructed so as to synthesize the image data (fig. 1, item 405; fig. 8) after the correction in said first area (fig. 8, bottom-right inner circle within item 1011), and uncorrected image data in said second area (fig. 8, top-right inner circle within item 1011).

Regarding **Claim 5**, Takizawa discloses wherein said movement information acquiring section (fig. 1, item 406) has a navigator echo collecting section (fig. 4, item 601) for collecting

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an echo signal (e.g., fig. 3, item 303) for a navigator when data for imaging are collected from said image pickup part (fig. 1, item 405; fig. 8), and also has a movement information generating section (fig. 2, item 407) for processing said echo signal and generating said movement information (“[t]he signal which each small RF coil of multiple coils received is detected” at ¶ 0014).

Regarding **Claim 7**, Takizawa discloses wherein said correcting section (fig. 1, item 407) is constructed so as to respectively make different corrections with respect to three areas or more (fig. 8, items 1021-1023) of said image data (fig. 8).

Regarding **Claim 9**, Takizawa discloses wherein said movement information acquiring section (fig. 1, item 406) has:

a navigator echo collecting section (fig. 4, item 601) for collecting an echo signal (e.g., fig. 3, item 303) for a navigator in one of a data read-out direction (“position change” at ¶ 0026) and a phase encode direction (“phase changes” at ¶ 0026) caused by the imaging when data for imaging are collected from said image pickup part (fig. 1, item 405; fig. 8);

a projection data generating section (fig. 1, item 407) for processing said echo signal (e.g., fig. 3, item 303) and generating projection data (“body motion amendment” at ¶ 0024); and

a movement information generating section (fig. 1, item 407) for using said projection data as said movement information (fig. 8, items 1021-1023).

Regarding **Claim 11**, Takizawa discloses wherein an image data collecting section (fig. 1, item 405; fig. 2, item 601) for collecting said image data (e.g., fig. 8) by using a single signal receiving RF coil is arranged (“an MRI device provided with a receiver coil which receives an NMR signal” at ¶ 0007; “RF coil” at ¶ 0013).

Regarding **Claim 12**, Takizawa discloses wherein said correcting section (fig. 1, item 407) is constructed so as to substantially generate plural image data (i.e., the image data of each coil) by multiplying said image data (e.g., fig. 8) in said image pickup part (fig. 1, item 406) by plural window functions having weight distributions different from each other (¶ 0029-0030).

Regarding **Claim 13**, Takizawa discloses wherein said correcting section (fig. 1, item 407) is constructed so as to perform linear correction processing (¶ 0033-0034 with respect to position, amplitude and phase) with respect to one of a position shift (“position change” at ¶ 0026) due to said movement (e.g., fig. 8, items 1021-1023) of said respective image data (fig. 8)

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in said first area (fig. 8, bottom-right inner circle within item 1011) and said second area (fig. 8, top-right inner circle within item 1011), and a phase shift (“phase changes” at ¶ 0026) within a voxel.

Regarding **Claim 14**, Takizawa discloses wherein said correcting section (fig. 1, item 407) is constructed so as to perform linear correction processing (¶0033) shown by one of a mean shift as a zeroth order of one of the phase and the position (“position change” and “phase changes” at ¶ 0026, both changes being the mean shift as a zeroth order), and affine transformation (e.g., “Fourier transform” at ¶ 0023).

Regarding **Claim 16**, Takizawa discloses wherein said movement information acquiring section (fig. 1, item 406) is constructed so as to acquire the movement information (“[t]he signal which each small RF coil of multiple coils received is detected” at ¶ 0014) showing a three-dimensional spatial distribution (“navigation echo of slice encode directions of three-dimensional imaging” at ¶ 0035), and said correcting section (fig. 1, item 407) is constructed so as to three-dimensionally make the correction on the basis of the movement information showing said three-dimensional spatial distribution (“this invention may be applied to a FSE sequence of an EPI sequence” at ¶ 0035 which includes movement correction).

Regarding **Claim 17**, Takizawa discloses wherein said information acquiring section (fig. 1, item 406) is constructed so as to acquire the movement information (fig. 8, items 1021-1023) showing a spatial distribution of the magnitude of the movement of a non-rigid body (fig. 8, item 1011).

Regarding **Claim 18**, Takizawa discloses wherein said movement information acquiring section (fig. 1, item 406)) is constructed so as to use the spatial distribution (e.g., fig. 8, spatial distribution items 1011, 1021, 1022) of the magnitude of a movement supposed in advance in said image pickup part (fig. 1, item 405).

Regarding **Claim 20**, Takizawa discloses wherein an image data collecting section (fig. 1, item 405; fig. 2, item 601) for collecting said image data (e.g., fig. 8) by providing a sensitivity distribution (e.g., fig. 8, items 1021-1023) according to the magnitude of the movement of said image pickup part (fig. 1, item 405) in advance is arranged.

Regarding **Claim 24**, Takizawa discloses wherein said image data collecting section (fig. 1, item 405; fig. 2, item 601) is constructed so as to collect said image data by using the multi-

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coil having plural element coils of sensitivity distributions different from each other ("multiple coils 1000 which consist of two or more receiver coils" at ¶ 0005; fig. 4, item 602).

Regarding **Claim 27**, Takizawa discloses wherein said correcting section is constructed so as to substantially generate plural image data (e.g., "slice encode directions of three-dimensional imaging" at ¶ 0035) by multiplying one portion or all portions of the plural image data collected by using said plural element coils by plural window functions (equation 1 of ¶ 0030) having weight distributions ("each small RF coil by carrying out weighting by the sensitivity distribution of the small RF coil" at ¶ 0029) different from each other.

Regarding **Claim 28**, Takizawa discloses an image data correcting device (fig. 1) comprising:

a correcting section (fig. 1, item 407) for making a correction different (fig. 8, items 1022 and 1023 are different) from that of a second area (fig. 8, top-right inner circle within item 1011) in a first area (fig. 8, bottom-right inner circle within item 1011) of image data of an image pickup part (fig. 1, item 405; fig. 8) of said detected body (fig. 8, item 1011 and the four smaller circles contained within item 1011) collected by a scan of magnetic resonance imaging (fig. 1) on the basis of said movement information ("signal processing part 407 has the body motion compensation means using the navigation echo" at ¶ 0015) showing a spatial distribution (e.g., fig. 8 shows a spatial distribution) of the magnitude of a movement in the real space of said image pickup part (fig. 1, item 405; fig. 8); and

a synthesizing section (fig. 1, item 408) for synthesizing respective image data of said first area and said second area corrected by said correcting section ("[t]he combined picture is displayed by the indicator 408" at ¶ 0015).

Regarding **Claim 29**, Takizawa discloses identical features from the correcting section as recited in Claim 2. Thus, references/arguments equivalent to those presented above for Claim 2 are equally applicable to Claim 29.

Regarding **Claim 37**, Takahashi discloses a method to perform the image data correcting device (fig. 1) as recited in Claim 1. Thus, references/arguments equivalent to those presented above for Claim 1 are equally applicable to Claim 37.

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Regarding **Claim 38**, Takahashi discloses a method to perform the image data correcting device (fig. 1) as recited in Claim 28. Thus, references/arguments equivalent to those presented above for Claim 28 are equally applicable to Claim 38.

Regarding **Claim 41**, Takahashi discloses a magnetic resonance imaging device (fig. 1) comprising:

- a movement information acquiring section (fig. 1, item 406) for acquiring movement information (“[t]he signal which each small RF coil of multiple coils received is detected” at ¶ 0014) showing a spatial distribution (e.g., fig. 8, spatial distribution items 1011, 1021, 1022) of the magnitude of a movement in the real space of an image pickup part (fig. 1, item 405; fig. 8) of a detected body (fig. 8, item 1011 and the four smaller circles contained within item 1011);

- an image data collecting section (fig. 1, item 406) for collecting image data of the image pickup part of said detected body (fig. 1, item 401) by a scan of magnetic resonance imaging (“MIR device” at ¶ 0011);

- a correcting section (fig. 1, item 407) for making a correction different (fig. 8, items 1022 and 1023 are different) from that of a second area (fig. 8, top-right inner circle within item 1011) in a first area (fig. 8, bottom-right inner circle within item 1011) of image data on the basis of said movement information (“signal processing part 407 has the body motion compensation means using the navigation echo” at ¶ 0015); and

- a synthesizing section (fig. 1, item 408) for synthesizing respective image data of said first area and said second area corrected by said correcting section (“[t]he combined picture is displayed by the indicator 408” at ¶ 0015).

Regarding **Claim 42**, Takahashi discloses an image data correcting device comprising:

- an image data collecting section (fig. 1, item 406) for collecting image data (e.g., fig. 8 slices) of the image pickup part of said detected body (fig. 1, item 401) by a scan of magnetic resonance imaging (“MIR device” at ¶ 0011);

- a correcting section (fig. 1, item 407) for making a correction different (fig. 8, items 1022 and 1023 are different) from that of a second area (fig. 8, top-right inner circle within item 1011) in a first area (fig. 8, bottom-right inner circle within item 1011) of said collected image data (fig. 8 slices) on the basis of movement information (“[t]he signal which each small RF coil of multiple coils received is detected” at ¶ 0014) showing a spatial distribution (e.g., fig. 8, spatial

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distribution items 1011, 1021, 1022) of the magnitude of a movement in the real space of said image pickup part (fig. 1, item 405); and

a synthesizing section (fig. 1, item 408) for synthesizing respective image data of said first area and said second area corrected by said correcting section ("[t]he combined picture is displayed by the indicator 408" at ¶ 0015).

Claim Rejections - 35 U.S.C. § 103

[13] The following is a quotation of 35 U.S.C. § 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Takizawa in view of Kretschmer

[14] **Claim 6** is rejected under § 103(a) as being unpatentable over Takizawa in view of U.S. Pat. No. 4,945,916 (issued Aug. 7, 1990) ("Kretschmer").

Regarding **Claim 6**, Takizawa does not disclose wherein said movement information acquiring section has: a sensor for detecting the movement of said image pickup part from the exterior optically or by air pressure; and a movement information generating section for processing a signal detected by said sensor and generating said movement information.

Kretschmer teaches an optical device for the simultaneous detection of heart and respiratory movements (fig. 3) that includes wherein a movement information acquiring section (fig. 3) has:

a sensor ("electro-optical means" at 1:40-47¹) for detecting the movement of said image pickup part from the exterior optically (fig. 1, item 5) or by air pressure ("air pressure on either side of the diaphragm" at 3:29-35); and

a movement information generating section (fig. 4 creating figs. 6, 7) for processing a signal detected by said sensor (input into fig. 4) and generating movement information ("cardiac and respiratory movements" at 1:8-14).

¹ "1:40-47" short notation for "Col. 1, lines 40-47".

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It would have been obvious to one of ordinary skill in the art at the time the invention was made for the movement information acquiring section of Takizawa to include a sensor for detecting the movement of said image pickup part from the exterior optically or by air pressure; and a movement information generating section for processing a signal detected by said sensor and generating said movement information as taught by Kretschmer "for the simultaneous detection of cardiac and respiratory movements" and "for synchronizing nuclear magnetic resonance imaging instruments". Kretschmer at 1:8-14.

Allowable Subject Matter

[15] Claims 8, 10, 15, 19, 21-23, 25, and 26 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Reasons for Indicating Allowable Subject Matter

[16] The following is a statement of reasons for the indication of allowable subject matter:

Regarding Claim 8, while the prior art of record discloses the image data correcting device of Claim 1, the prior art of record does not teach obtaining processing information including average values of the amplitude and phase of the movement of each part and generating said movement information on the basis of said profile and said processing information.

Regarding Claim 10, while the prior art of record discloses the image data correcting device of Claim 1, the prior art of record does not teach calculating a shift of one of a phase distribution of a k-space of said echo signal and a position of at least one direction of an r-space of said movement information.

Regarding Claim 15, while the prior art of record discloses the image data correcting device of Claim 1, the prior art of record does not teach a pulse series based on one of a spin warp method, a spiral method, and a radial method in a pulse series of one of a multi-shot type and a single type is arranged.

Regarding Claim 19, while the prior art of record discloses the image data correcting device of Claim 1, the prior art of record does not teach including a non-correction with respect to two areas or more obtained by mutually synthesizing one portion of at least three areas or

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more in said image data of said image pickup part. Claims 22-23 would be allowable by dependency.

Regarding Claim 21, while the prior art of record discloses the image data correcting device of Claim 1, the prior art of record does not teach constructing such that a distribution substantially linearly increased from the back side of said abdominal part to said abdominal wall side.

Regarding Claim 25, while the prior art of record discloses the image data correcting device of Claim 1, the prior art of record does not teach two surface coils respectively arranged on the back side and the abdominal wall side as said plural element coils. Claim 26 allowable by analogy.

Conclusion

Citation of Pertinent Prior Art

[17] The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: US 5251629 A; US 5818231 A; US 20030171668 A1; US 20030179918 A1; US 20040056660 A1; US 20080200800 A1; and US 20080281186 A1.

[18] Any inquiry concerning this communication or earlier communications from the examiner should be directed to DAVID P. RASHID whose telephone number is (571)270-1578 and fax number (571)270-2578. The examiner can normally be reached Monday - Friday 7:30 - 17:00 ET.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh Mehta can be reached on (571) 272-7453. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would

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like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/David P. Rashid/
Examiner, Art Unit 2624

David P Rashid
Examiner
Art Unit 26244